

WHAT IS CLAIMED IS:

1. A mobile communication system including a
radio control station, a base station connected to the
radio control station, and a mobile station which
5 performs, with the base station, data communication in
a parallel combinatory spread-spectrum scheme,

the radio control station comprising:

a storage which stores a plurality of data
communication rates and a plurality of transmission
10 power ratios, the plurality of the data communication
rates and the plurality of the transmission power
ratios corresponding to a plurality of parameters used
in the parallel combinatory spread-spectrum scheme,
the plurality of the parameters indicating numbers of
15 assignment spreading codes and multicoding schemes;

a first acquisition unit configured to acquire,
from the storage, at least one of the parameters,
an acquired one of the parameters corresponding to
the number of the assignment spreading codes and the
20 transmission power ratio, at least one data communica-
tion rate corresponding to at least acquired one of
the parameters being higher than and close to a data
communication guaranteed rate of a communication
service;

25 a second acquisition unit configured to acquire,
from the base station, the number of assignment
spreading codes and a transmission power ratio;

a computation unit configured to perform computation, if the first acquisition unit acquires a plurality of the parameters, based on each of the numbers of the assignment spreading codes acquired
5 from the storage and each of transmission power ratios acquired from the storage, and the number of assignment spreading codes and a transmission power ratio acquired from the base station, the computation unit determining, from the computation, one parameter
10 suitable for a margin for the number of the assignment spreading codes acquired from the base station and a margin for the transmission power ratio acquired from the base station; and

a transmitter which transmits a determined
15 parameter to the base station,

the base station comprising:

a receiver which receives the determined parameter from the radio control station;

a determination unit configured to determine
20 transmission power for transmitting data to the mobile station, based on a transmission power ratio corresponding to the determined parameter; and

a first transmitter which transmits data with the transmission power to the mobile station, the data
25 being generated by using the determined parameter and performing spreading processing, and

the mobile station comprising:

a reproduction unit configured to reproduce the data by using the determined parameter and performing despreading processing.

5 2. The mobile communication system according to claim 1, wherein the transmission power ratios are defined based on reliability of the multicoding scheme during demodulating the data using the parallel combinatory spread-spectrum scheme.

10 3. The mobile communication system according to claim 1, wherein the base station further comprises a second transmitter which transmits the determined parameter to the mobile station before transmitting the data, the second transmitter performing a negotiation with the mobile station.

15 4. The mobile communication system according to claim 1, wherein the storage includes a parameter rate ROM which stores rate data corresponding to the numbers of assignment spreading codes and the multicoding schemes, and a parameter transmission power ratio ROM
20 which stores transmission power data corresponding to the numbers of assignment spreading codes and the multicoding schemes.

25 5. The mobile communication system according to claim 1, wherein the radio control station further comprises a user guaranteed data rate ROM which stores a guaranteed rate of data communication corresponding to the communication service.

6. The mobile communication system according to claim 1, wherein:

the base station further comprises a mapping ROM which stores a plurality of selected spreading-code-
5 data items and a plurality of spreading codes, the selected spreading-code-data items being mapped into the spreading codes based on the number of the assignment spreading codes and the multicoding schemes; and the spreading codes read from the mapping ROM and
10 corresponding to the determined parameter, and data to be transmitted to the mobile station are subjected to a predetermined operation, and an operation results are transmitted to the mobile station.

7. The mobile communication system according to claim 1, wherein:

the base station further comprises a parameter transmission power ratio ROM which stores transmission data corresponding to the number of assignment spreading codes and the multicoding schemes; and
20 transmission power corresponding to the determined parameter is read from the parameter transmission power ratio ROM, and transmission power used to transmit data to the mobile station is controlled based on a read transmission power.

8. The mobile communication system according to claim 1, wherein if a smaller number of mobile stations than a predetermined value access the base station from

shorter distances than a predetermined value, the radio control station selects one of the parameters for each of the base stations, the one of the parameters indicating the number of assignment spreading codes smaller than a predetermined value, and transmission power higher than a predetermined value.

9. The mobile communication system according to claim 1, wherein if a larger number of mobile stations than a predetermined value access the base station from longer distances than a predetermined value, the radio control station selects one of the parameters for each of the base stations, the one of the parameters indicating the number of assignment spreading codes larger than a predetermined value, and transmission power lower than a predetermined value.

10. A radio control station comprising:
a storage which stores a plurality of data communication rates and a plurality of transmission power ratios, the plurality of the data communication rates and the plurality of the transmission power ratios corresponding to a plurality of parameters used in the parallel combinatory spread-spectrum scheme employed in data communication between a base station and a mobile station, the plurality of the parameters indicating numbers of assignment spreading codes and multicoding schemes;

a first acquisition unit configured to acquire,

from the storage, at least one of the parameters,
an acquired one of the parameters corresponding to
the number of the assignment spreading codes and the
transmission power ratio, at least one data communica-
5 tion rate corresponding to at least acquired one of
the parameters being higher than and close to a data
communication guaranteed rate of a communication
service;

10 a second acquisition unit configured to acquire,
from the base station, the number of assignment
spreading codes and a transmission power ratio;

a computation unit configured to perform
computation, if the acquisition unit acquires
a plurality of the parameters, based on each of the
15 numbers of the assignment spreading codes acquired
from the storage and each of transmission power ratios
acquired from the storage, and the number of assignment
spreading codes and a transmission power ratio
acquired from the base station, the computation unit
20 determining, from the computation, one parameter
suitable for a margin for the number of the assignment
spreading codes acquired from the base station and
a margin for the transmission power ratio acquired from
the base station; and

25 a transmitter which transmits a determined
parameter to the base station.

11. The radio control station according to

claim 10, wherein the transmission power ratios are defined based on reliability of the multicoding scheme during demodulating the data using the parallel combinatory spread-spectrum scheme.

5 12. The radio control station according to claim 10, wherein the storage includes a parameter rate ROM which stores rate data corresponding to the numbers of assignment spreading codes and the multicoding schemes, and a parameter transmission power ratio ROM
10 which stores transmission power data corresponding to the numbers of assignment spreading codes and the multicoding schemes.

 13. The radio control station according to claim 10, further comprising a user guaranteed data
15 rate ROM which stores a guaranteed rate of data communication corresponding to the communication service.

 14. A base station comprising:
 a receiver which receives, from a radio control
20 station, a determined parameter used in a parallel combinatory spread-spectrum scheme employed in data communication between the base station and a mobile station, the determined parameter indicating numbers of assignment spreading codes and multicoding schemes;

25 a first transmitter which transmits the determined parameter to the mobile station;

 a determination unit configured to determine

transmission power used to transmit data to the mobile station, based on a transmission power ratio corresponding to the determined parameter; and

5 a second transmitter which transmits, to the mobile station with the transmission power, data obtained by performing spread processing on the first-mentioned data, using the determined parameters.

15 15. The base station according to claim 14, further comprising a third transmitter which transmits the determined parameter to the mobile station before transmitting the data, the third transmitter performing a negotiation with the mobile station.

15 16. The base station according to claim 14, further comprising a mapping ROM which stores a plurality of selected spreading-code-data items and a plurality of spreading codes, the selected spreading-code-data items being mapped into the spreading codes based on the number of the assignment spreading codes and the multicoding scheme, and

20 wherein the spreading codes read from the mapping ROM and corresponding to the determined parameter, and data to be transmitted to the mobile station are subjected to a predetermined operation, and an operation results are transmitted to the mobile station.

25 17. The base station according to claim 14, further comprising a parameter transmission power

ratio ROM which stores transmission data corresponding to the number of assignment spreading codes and the multicoding schemes, and

5 wherein transmission power corresponding to the determined parameter is read from the parameter transmission power ratio ROM, and transmission power used to transmit data to the mobile station is controlled based on a read transmission power.

10 18. A mobile communication system including a transmitter, and a receiver which performs data communication of a parallel combinatory spread-spectrum scheme with the transmitter,

the transmitter comprising:

15 a storage which stores a plurality of data communication rates and a plurality of transmission power ratios, the plurality of the data communication rates and the plurality of the transmission power ratios corresponding to a plurality of parameters used in the parallel combinatory spread-spectrum scheme,
20 the plurality of the parameters indicating numbers of assignment spreading codes and multicoding schemes;

25 a first acquisition unit configured to acquire, from the storage, at least one of the parameters, an acquired one of the parameters corresponding to the number of the assignment spreading codes and the transmission power ratio, at least one data communication rate corresponding to at least acquired one of

the parameters being higher than and close to a data communication guaranteed rate of a communication service;

5 a second acquisition unit configured to acquire, from the transmitter, the number of assignment spreading codes and a transmission power ratio;

10 a computation unit configured to perform computation, if the first acquisition unit acquires a plurality of the parameters, based on each of the numbers of the assignment spreading codes acquired from the storage and each of transmission power ratios acquired from the storage, and the number of assignment spreading codes and a transmission power ratio acquired from the transmitter, the computation unit determining, 15 from the computation, one combination of the parameters suitable for a margin for the number of assignment spreading codes and a margin for the transmission power ratio;

20 a first transmitter which transmits a determined parameter to the receiver;

a determination unit configured to determine transmission power used to transmit data to the receiver; and

25 a second transmitter which transmits, to the receiver with the transmission power, data obtained by performing spread processing on the first-mentioned data, using the determined parameter,

the receiver comprising:

a receiver which receives the determined parameter from the transmitter; and

a reproduction unit configured to reproduce
5 received data using the determined parameter.

19. The mobile communication system according to claim 18, wherein the transmission power ratios are defined based on reliability of the multicoding scheme during demodulating the data using the parallel
10 combinatory spread-spectrum scheme.

20. The mobile communication system according to claim 18, wherein the storage includes a parameter rate ROM which stores rate data corresponding to the numbers of assignment spreading codes and the multicoding
15 schemes, and a parameter transmission power ratio ROM which stores transmission power data corresponding to the numbers of assignment spreading codes and the multicoding schemes.

21. The mobile communication system according to
20 claim 18, wherein:

the transmitter further comprises a mapping ROM which stores a plurality of selected spreading-code-data items and a plurality of spreading codes, the selected spreading-code-data items being mapped
25 into the spreading codes based on the number of the assignment spreading codes and the multicoding schemes; and

the spreading codes read from the mapping ROM and corresponding to the determined parameter, and data to be transmitted to the receiver are subjected to a predetermined operation, and an operation results are transmitted to the receiver.

22. The mobile communication system according to claim 18, wherein:

the transmitter further comprises a parameter transmission power ratio ROM which stores transmission data corresponding to the number of assignment spreading codes and the multicoding schemes; and

transmission power corresponding to the determined parameter is read from the parameter transmission power ratio ROM, and transmission power used to transmit data to the receiver is controlled based on a read transmission power.